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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,503	09/03/2004	Ryou Obara	1823-0123PUS1	8273

2292 7590 06/16/2005

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EXAMINER
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SAVAGE, JASON L

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 06/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/501,503

Applicant(s)

OBARA, RYOU

Examiner

Jason L. Savage

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 07152004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

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***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori (US 4,579,712) in view of McCune, Jr. et al (US 5,364,663).

Mori teaches a graphite containing phosphor bronze coating used as a material for piston rings (col. 1, ln. 7-16). Mori further teaches that the coating may comprise Sn between 7.5-16 wt%, graphite between 1-8 wt% and phosphorous between 0.03 to 1 wt% with the balance essentially consisting of Cu (col. 2, ln. 20-39).

Regarding the limitation that graphite be from 5 to 50 % in the claims, the teaching in Mori of 1-8 wt% anticipates the claim limitation over the range of 5-8 wt%.

Regarding the limitation that the coating is thermally sprayed, Mori is silent to the use of a thermal spray process to deposit the coating. However, McCune teaches a methods of thermally spraying metal coatings containing graphite lubricants wherein the matrix metal may comprise a variety materials including copper (col. 2, ln. 40-59). McCune further teaches that such metal coatings containing graphite are suitable for use as automotive components (col. 2, ln. 60-68) and further teaches that known benefits of forming the coating by the inventive method include forming coatings having greater thicknesses and having greater adherence to the substrate (col. 3, ln. 33-51).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have applied the teachings of McCune to the invention of Mori and formed the graphite containing copper coating on a piston ring by thermally spraying. One would have been motivated to employ the thermal spraying process in order to form a more adherent coating.

Regarding claim 2, the coating formed by Mori as modified by McCune would meet the claim limitation of being formed on a peripheral surface.

Regarding claim 3, although Mori and McCune are silent to the volume ratio of the graphite particles, absent a teaching of the criticality of the claimed volume ratio, it would not provide a patentable distinction over the prior art. Given that Mori teaches the graphite may be contained in an amount of between 5-8wt%, it would have been obvious to one of ordinary skill in the art to have included graphite in a similar volume ratio since both properties are based on the relative amounts of materials.

Regarding claims 4 and 5, Mori teaches that phosphorus may be included in the coating in an amount of between 0.03-1 wt% which would meet the limitation that P be containing in an amount of 1.0 % at the highest in claim 4 and that the total amount of the claimed elements is no more than 25 % in claim 5

Regarding claim 6, Mori teaches the hardness of the coating layer is 55.0 Hv (col. 6, Table I). Although the hardness would vary somewhat from that disclosed in the table due to the greater amount of graphite and forming by thermal spraying as opposed to the powder deposition process recited by Mori, it would be reasonable to expect that

the hardness would be substantially less than the 300 Hv maximum claimed by Applicant.

Regarding claim 7, Mori teaches that the coating structure may have an upper coating layer of the inventive coating alloy material and a lower coating layer of copper (col. 3, ln. 1-4). As such, it would have been obvious to have formed a thermally sprayed coating comprising multiple layers such as a coating having an upper sprayed layer of the inventive alloy material and a lower sprayed layer of copper since Mori teaches such a multilayer coating may be formed.

Regarding claim 8, Mori teaches that the coating is has a final thickness of 400  $\mu\text{m}$  (col. 3, ln. 8-17). McCune teaches that the thermally sprayed coating may have a thickness of 100-2,000  $\mu\text{m}$  (col. 3, ln. 44-45). As such, it would have been obvious to have formed the thermally sprayed coating having a final thickness of approximately 400  $\mu\text{m}$  since Mori specifically recites that such as coating thickness is desirable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Savage whose telephone number is 571-272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jason Savage  
6-13-05



DEBORAH JONES  
SUPERVISORY PATENT EXAMINER